

## Claims

1. A system for detecting photo-plethysmographic signals from a patient ear canal, comprising a sensor's housing, a first light emitting source, a light detector and a housing extension, wherein distal side of said housing extension is inserted into the patient ear and proximal side of the extension is optically coupled to said light emitting sources and light detector.
2. A system for detecting photo-plethysmographic signals from a patient ear canal as defined in claim 1 further comprising a second light emitting source operating at a different wavelength from first light source and a processor for computer arterial blood oxygenation.
3. A system for detecting photo-plethysmographic signals from a patient ear canal as defined in claim 1 wherein said housing extension is fabricated of material that is substantially transparent for wavelength of light generated by said first light emitting source.
4. A method for monitoring patient's arterial blood oxygenation and core temperature by an ear probe consisting of a housing, ear plug, two light emitting devices, one light detecting device, a heater and a temperature detector, comprising steps of
  - Attaching temperature sensor to a flexible ear plug;
  - Inserting the ear plug into the patient's ear canal;
  - Alternatively transmitting to the ear canal two wavelengths of light from two light emitting devices and measuring the reflected light by a light detecting device;
  - Measuring temperature of said ear plug by said temperature sensor;
  - Measuring temperature of the ear probe by said temperature detector;
  - Generating heat by said heater to minimize temperature difference between said temperature sensor and said temperature detector;
  - Computing level of blood oxygenation from the signals detected by said light detecting device, and

- Computing the patient core temperature from signals received from said temperature sensor and temperature detector.

5. A method for monitoring patient's arterial blood oxygenation and core temperature by a body surface probe consisting of a housing, two light emitting devices, one light  
5 detecting device, a heater and a temperature detector, comprising steps of

- Inserting the probe to the surface of a patient's body;
- Alternatively transmitting to the patient body two wavelengths of light from two light emitting devices and measuring the reflected light by a light detecting device;
- 10 - Measuring surface temperature of the patient by said temperature sensor;
- Measuring temperature of the probe by said temperature detector;
- Generating heat by said heater to minimize temperature difference between said temperature sensor and said temperature detector;
- 15 - Computing level of blood oxygenation from the signals detected by said light detecting device, and
- Computing the patient core temperature from signals received from said temperature sensor and temperature detector.